

## REMARKS

Applicants appreciate the thorough Examination of the present application that is reflected in the Office Action of November 15, 2005. In response, Claims 8-28, 31, and 46-64 have been cancelled in response to the Examiner's indication that his election requirement was proper and made Final. Applicants acknowledge the indication that Claims 31-37 would be allowable if rewritten in independent form and that Claims 38-45 are allowable. The language of Claim 31 has been inserted into Claim 29 by amendment. Applicants respectfully request reconsideration of the present application and allowance of pending Claims 1-7 and 31-45.

### **I. Claim Rejections under 35 U.S.C. §102 or §103 based on Moeck et al.**

Claims 1 and 5-7 are rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Application Publication No. 2004/0168626 by Moeck et al. (hereinafter "Moeck"). Claims 2-4 are rejected under 35 U.S.C. §103(a) as being unpatentable over Moeck.

The Examiner maintains that Moeck discloses a method for forming a nanostructure, comprising self-assembling a nanodot array in a matrix material from a nanodot material based upon a difference in Gibb's free energy of oxidation of the nanodot material and the matrix material. With respect to the specific difference in Gibb's free energy of oxidation, the Examiner maintains that it would have been obvious to one having ordinary skill in the art at the time the invention was made that since the difference in Gibb's free energy of oxidation between the nanodot material and the matrix material is depending on the material(s) being used for the nanodot material and the matrix material, and both Moeck and Whiteford use numerous materials for the nanodot material and the matrix material, therefore, the difference in Gibb's free energy of oxidation between the nanodot material and the matrix material in the inventions of Moeck and/or Whiteford can be at various corresponding values. The Applicants respectfully disagree.

The Applicants' invention relates to forming a **three-dimensional** multi-layer nanostructure with less than 100nm size and having multiple layers of arrays of uniformly

distributed nanoparticles in which size and number density can be controlled precisely. This is accomplished by self-assembling multiple layers of a nanodot array in a matrix material based on a difference in Gibb's free energy of oxidation of a nanodot material and the matrix material. Such process using self-assembly of multiple layers is not taught by Moeck.

Moeck merely provides a single layer substrate formed by using Stranski-Krastanow mode of heteroepitaxial growth. The quantum dot array results from the growth of an initial two-dimensional layer followed by the growth of three-dimensional islands over the initial layer. (See paragraph [0067].) Such quantum dots are connected and the ending structure is a single layer unlike the multiple layers of arrays of the invention.

In sharp contrast, the present invention provides a method of forming multiple layers of uniformly dispersed arrays of nanodots in the matrix material over the substrate by using island growth (sometimes referred to as Volmer-Weber growth). Therefore, the nanodots of the present invention are self contained. By selecting the nanodot material and the matrix material so that the Gibb's free energy of oxidation of the matrix material is lower than that of the nanodot material, the self-assembly of multi-layers of uniformly dispersed arrays of nanodots can occur. Such selection and self-assembly of multi-layers is not taught or suggested by Moeck.

With respect to Whiteford, it too relates to the formation of a two-dimensional nanostructure based on a chemical process. Whiteford merely proposed stacking two-dimension nanostructures and does not teach or suggest the self-assembly of multiple layers of the present invention, and does not cure the deficiencies of Moeck.

## **II. Claim Rejections Under 35 U.S.C. §102 Based on Wu**

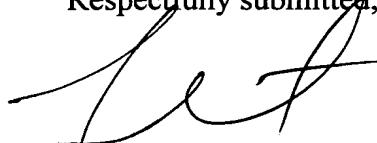
Claims 29-30 are rejected under 35 U.S.C. §102(e) as anticipated by U.S. Patent Application Publication No. 2003/0108683 by Wu. Applicants have amended Claim 29 to include the recitations of Claim 31. The Examiner has indicated that Claim 31 was merely objected to as being dependent on a rejected based claim but would be allowable if rewritten. Thus Applicants believe amended Claim 29 is allowable.

In re: Narayan et al.  
Application No.: 10/723,842  
Filed: November 26, 2003  
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### CONCLUSION

Accordingly, Applicants submit that the present application is in condition for allowance and the same is earnestly solicited. Should the Examiner have any small matters outstanding of resolution, he is encouraged to telephone the undersigned at 919-854-1400 for expeditious handling.

Respectfully submitted,



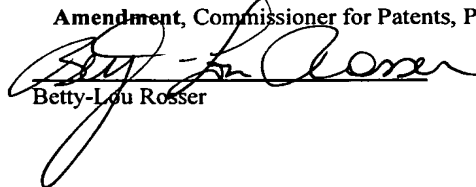
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